

Listing of Claims:

1. (Currently Amended) A method, with an information processing system, for specifying equivalent resources in a policy driven automatic computing system, the method comprising:

identifying a set of resource equivalencies to achieve a desired end state of an autonomic computing system, wherein the set of resource equivalencies comprise a resource equivalency representing a plurality of physically distinct resources that are logically equivalent, and wherein the desired end state indicates an operational state associated with one or more autonomic computing system elements to be achieved by the autonomic computing system by utilizing one or more resources associated with the set of resource equivalencies without violating relationship specifications associated with the plurality of physically distinct resources associated with the set of resource equivalencies, based on at least one of wherein identifying the set of resource equivalencies comprises:

receiving a user specification of resource equivalencies for an autonomic computing system, wherein the specification of resource equivalencies includes at least a resource class type specification and a set of resource relationships associated with a set of resources for accomplishing a desired end state of the autonomic computing system, wherein the set of resource relationships received from the user only specify relationships associated with a top-most level set of resources in the set of resources, wherein an availability of one or more of the top-most level set of resources is dependent on the availability of one or more resources of a lower level set of resources in a reverse hierarchy of dependencies from top-most level to lowest level set of resources; and
creating at least one grouping of resources of the at least one resource class type;

creating a filter from a set of attributes that define a required functional attribute of a type of resource corresponding to the resource class type specification received from the user;

removing from the at least one grouping of resources any resource that does not match the filter;

defining a set of resources remaining in the at least one grouping as a set of equivalent resources, wherein each resource in the set of equivalent resources perform at least one substantially similar service, the at least one substantially similar service corresponding to the corresponding to the resource class type specification; and

automatically ~~discovery~~ discovering of resource attributes related to the user specification of resource equivalencies;

wherein automatically discovering resource attributes comprises:

harvesting implicit relationships among the set of resources via self-discovery, wherein the set of implicit relationships at least indicate one or more of a set of resource dependencies for at least one resource in the set of resources and location requirements for at least one resource in the set of resources, and wherein the set of implicit relationships are discovered automatically without the user explicitly specifying the implicit relationships, wherein the set of implicit relationships are relationships associated from the top-most level set of resources to a lower level set of resources in the set of resources;

discovering an additional resource based on the harvesting;

matching attributes of the additional resource to the filter;

including the additional resource in the set resources remaining in the at least one grouping defined as the set of equivalent resources;

discovering a resource deletion from the autonomic computing system;

determining whether that the resource deletion is represented in the set of resources remaining in the at least one grouping defined as the set of resource equivalencies; and

removing the resource from the set of resource equivalencies; and

nesting two or more sets of equivalent resources within the set of resource equivalencies;

storing the set of resource equivalencies in memory, ~~wherein each resource in a resource equivalency performs substantially identical services as other resources in the resource equivalency, the substantially identical services corresponding to the user specification of resource equivalencies;~~

selecting at least one resource equivalency from the set of resource equivalencies;
selecting at least one resource from the selected resource equivalency; and
using the selected at least one resource as required by the autonomic computing
system to perform at least one service.

Claims 2-7 (Cancelled)

8. (Currently Amended) A computer readable storage product for specifying equivalent resources in a policy driven automatic computing system comprising computer instructions for performing the following:

identifying a set of resource equivalencies to achieve a desired end state of an autonomic computing system, wherein the set of resource equivalencies comprise a resource equivalency representing a plurality of physically distinct resources that are logically equivalent, and wherein the desired end state indicates an operational state associated with one or more autonomic computing system elements to be achieved by the autonomic computing system by utilizing one or more resources associated with the set of resource equivalencies without violating relationship specifications associated with the plurality of physically distinct resources associated with the set of resource equivalencies, based on at least one of wherein identifying the set of resource equivalencies comprises:

receiving a user specification of resource equivalencies for an autonomic computing system, wherein the specification of resource equivalencies includes at least a resource class type specification and a set of resource relationships associated with a set of resources for accomplishing a desired end state of the autonomic computing system, wherein the set of resource relationships received from the user only specify relationships associated with a top-most level set of resources in the set of resources, wherein an availability of one or more of the top-most level set of resources is dependent on the availability of one or more resources of a lower level set of resources in a reverse hierarchy of dependencies from top-most level to lowest level set of resources; and

creating at least one grouping of resources of the at least one resource class type;

creating a filter from a set of attributes that define a required functional attribute of a type of resource corresponding to the resource class type specification received from the user;

removing from the at least one grouping of resources any resource that does not match the filter;

defining a set of resources remaining in the at least one grouping as a set of equivalent resources, wherein each resource in the set of equivalent resources perform

at least one substantially similar service, the at least one substantially similar service corresponding to the corresponding to the resource class type specification; and

automatically ~~discovery~~ discovering of resource attributes related to the user specification of resource equivalencies;

wherein automatically discovering resource attributes comprises:

harvesting implicit relationships among the set of resources via self-discovery, wherein the set of implicit relationships at least indicate one or more of a set of resource dependencies for at least one resource in the set of resources and location requirements for at least one resource in the set of resources, and wherein the set of implicit relationships are discovered automatically without the user explicitly specifying the implicit relationships, wherein the set of implicit relationships are relationships associated from the top-most level set of resources to a lower level set of resources in the set of resources;

discovering an additional resource based on the harvesting;

matching attributes of the additional resource to the filter;

including the additional resource in the set resources remaining in the at least one grouping defined as the set of equivalent resources;

discovering a resource deletion from the autonomic computing system;

determining whether that the resource deletion is represented in the set of resources remaining in the at least one grouping defined as the set of resource equivalencies; and

removing the resource from the set of resource equivalencies; and

nesting two or more sets of equivalent resources within the set of resource equivalencies;

~~storing the set of resource equivalencies in memory, wherein each resource in a resource equivalency performs substantially identical services as other resources in the resource equivalency, the substantially identical services corresponding to the user specification of resource equivalencies;~~

~~selecting at least one resource equivalency from the set of resource equivalencies;~~

~~selecting at least one resource from the selected resource equivalency; and~~

using the selected at least one resource as required by the autonomic computing system to perform at least one service.

Claims 9-25 (Cancelled)

26. (New) An autonomic computing system resource manager, comprising:

memory;

a resource monitor, communicatively coupled with each resource in an autonomic computing system, and with the memory, for monitoring, and exchanging data with, each resource in the autonomic computing system;

an equivalency definer, communicatively coupled with each resource in the autonomic computing system, and with the memory, for identifying a set of resource equivalencies to achieve a desired end state of a an autonomic computing system, wherein the set of resource equivalencies comprise a resource equivalency representing a plurality of physically distinct resources that are logically equivalent, and wherein the desired end state indicates an operational state associated with one or more autonomic computing system elements to be achieved by the autonomic computing system by utilizing one or more resources associated with the set of resource equivalencies without violating relationship specifications associated with the plurality of physically distinct resources associated with the set of resource equivalencies, wherein identifying the set of resource equivalencies comprises:

receiving a user specification of resource equivalencies for an autonomic computing system, wherein the specification of resource equivalencies includes at least a resource class type specification and a set of resource relationships associated with a set of resources for accomplishing a desired end state of the autonomic computing system, wherein the set of resource relationships received from the user only specify relationships associated with a top-most level set of resources in the set of resources, wherein an availability of one or more of the top-most level set of resources is dependent on the availability of one or more resources of a lower level set of resources in a reverse hierarchy of dependencies from top-most level to lowest level set of resources;

creating at least one grouping of resources of the at least one resource class type;

creating a filter from a set of attributes that define a required functional attribute of a type of resource corresponding to the resource class type specification received from the user;

removing from the at least one grouping of resources any resource that does not match the filter; and

defining a set of resources remaining in the at least one grouping as a set of equivalent resources, wherein each resource in the set of equivalent resources perform at least one substantially similar service, the at least one substantially similar service corresponding to the corresponding to the resource class type specification; and

storing the set of resource equivalencies in memory;

a resource harvester, communicatively coupled with each resource in the autonomic computing system, the resource monitor, and the equivalency definer for automatically discovering resource attributes related to the user specification of resource equivalencies, wherein automatically discovering resource attributes comprises:

harvesting implicit relationships among the set of resources via self-discovery, wherein the set of implicit relationships at least indicate one or more of a set of resource dependencies for at least one resource in the set of resources and location requirements for at least one resource in the set of resources, and wherein the set of implicit relationships are discovered automatically without the user explicitly specifying the implicit relationships, wherein the set of implicit relationships are relationships associated from the top-most level set of resources to a lower level set of resources in the set of resources;

discovering an additional resource based on the harvesting;

matching attributes of the additional resource to the filter;

including the additional resource in the set resources remaining in the at least one grouping defined as the set of equivalent resources;

discovering a resource deletion from the autonomic computing system;

determining whether that the resource deletion is represented in the set of resources remaining in the at least one grouping defined as the set of resource equivalencies; and

removing the resource from the set of resource equivalencies; and

defining at least one equivalency representing at least two sets of equivalent resources nested within at least one set of equivalent resources in the set of equivalent resources;

a policy generator, communicatively coupled with the memory, for determining, policy definitions associated with the set of resources for achieving the desired end state

associated with the autonomic computing system, wherein the policy definitions are determined based on the set of resource relationships received from the user and the implicit relationships that have been discovered, and wherein the policy definitions define at least one of operational policies indicating how to operate the set of resources and selection policies indicating how to select resources in the set of resources to achieve the desired end state, and generating a system-wide directed graph, based on at least the set of resource relationships received from the user, the implicit relationships that have been discovered, and the policy definitions that have been determined that specifies a set of interrelations between the set of resources; and

an automation engine, communicatively coupled with the resource monitor, with each resource in the autonomic computing system, and with the memory, for

selecting at least one resource equivalency from the set of resource equivalencies;

selecting at least one resource from the selected resource equivalency;

using the selected at least one resource as required by the autonomic computing system to perform at least one service; and

providing available actions to at least one available resource in the autonomic computing system, the at least one available resource being selected from at least one available resource represented in the set of resource equivalencies in order for the autonomic computing system to establish and maintain the desired end state;

wherein the at least one set of equivalent resources comprises at least one network interface card all being logically equivalent in the autonomic computing system, and wherein

the automation engine provides available actions to at least one network interface card in the autonomic computing system, the at least one network interface card being selected from at least one available network interface card represented in at least one equivalency in order for the autonomic computing system to establish and maintain a desired end state.